Chapter 3: PNFS Namespace

3.1 UNIX Commands You can Use in PNFS Space

Data files do not actually reside in `/pnfs` namespace, and errors occur on attempts to read or write the content of the files, or to manipulate the content. Therefore, UNIX commands such as **`cat`**, **`more`**, **`less`**, **`grep`**, **`head`**, **`tail`**, **`wc`**, **`od`**, **`file`**, **`cp`**, and so on, fail if you run them on files listed under `/pnfs`. However, virtually any non-I/O UNIX command can be used in `/pnfs` namespace. For these commands, the standard options work in the standard way. Commands that you may find useful include:

• ls	• pwd
• mv and mvdir	• find
• rm and rmdir	• cd
• mkdir	• ln (hard links only)[a]
• stat[b]	

a. For ln, hard links must be used to ensure that all the metadata information is linked; symbolic links do not work properly .
b. Stat is not available in all operating systems.

3.2 About PNFS Tags

Before files can be written to tape, Enstore needs to know where and how to write them. Pnfs uses tag files (usually just called tags) in the `/pnfs` namespace to specify this type of configuration information, and **encp** transfers this information to Enstore. Tags are associated with directories in the `/pnfs` namespace, not with any specific file, and thus apply to all files

within a given directory. As a new directory in the `/pnfs` namespace is created, it inherits the tags of its parent directory. Allowable characters within tags are: alphanumeric characters, underscore (_), dash (**-**), and slash (**/**).

3.2.1 Tag Listing

The tags include:

file-family	This tag determines the file family associated with all files in this directory. See section 1.4.1 *File Family* for information on file families.
file-family-width	This tag determines the file family width associated with all files in this directory. See section 1.4.2 *File Family Width* for information on file family width.
file-family-wrapper	This tag determines the file family wrapper associated with all files in this directory. See section 1.4.3 *File Family Wrapper* for information on file family wrappers. The default is `cpio_odc`.
library	This tag determines the virtual library (and thus the library manager) associated with all files in this directory. See section 7.3 *Library Manager* for information about the library.
storage-group	This tag determines the storage group associated with all files in this directory, and shows up as your experiment's top level directory under `/pnfs`. Typically, one storage group is associated with an entire experiment. A storage group is assigned to each experiment by the Enstore administrators. Users never change this tag.

3.2.2 How to View Tags

Off-site users cannot mount pnfs, and therefore cannot see tags. On-site users: to see the values of the tags for a given directory, first setup **encp** (with qualifier, see section 5.1 *Setup encp*) then **`cd`** to the `/pnfs` subdirectory of interest (or enter the directory as an argument to `--tags`) and enter the command:

```
% enstore pnfs --tags
```

```
.(tag)(file_family) = dcache
.(tag)(file_family_width) = 1
.(tag)(file_family_wrapper) = cpio_odc
.(tag)(library) = eagle
.(tag)(storage_group) = test
-rw-rw-r--   11 xyz     sys            6 Jul 26 10:22 .(tag)(file_family)
```

```
-rw-rw-r--   11 xyz     sys            1 May  5  2000 .(tag)(file_family_width)
-rw-rw-r--   11 xyz     sys            8 May  5  2000 .(tag)(file_family_wrapper)
-rw-rw-r--   11 xyz     sys            5 May  5  2000 .(tag)(library)
-rw-r--r--   11 xyz     sys            4 Jul 26 10:20 .(tag)(storage_group)
```

The output first lists the tags and their values, then the tags again in long format to show the owners and protection modes.